



# Sub-atomic Particles and Prisoners: A novel examination of Socio-physics and Penology

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## Abstract

*Social scientists have traditionally worked in an isolated and independent fashion. However, contemporary researchers are more willing to adopt an interdisciplinary approach. While cross-disciplinary excursions are increasingly common, little is known about how the social sciences in general and penology in particular might be advanced through a natural sciences' perspective. In this paper, the author compares the atomic and penal realms in an attempt to provide insight into prison operations, human behavior, and ways to break the criminogenic cycle.*

Keywords: Socio-physics; Penology; Peer-entanglement; Particle; Negative-orientation.

## Introduction

Of late, it has been noted that an interest exists in how the natural sciences can be applied to the social sciences. This interest has encouraged the author to become familiar with the works of many twentieth century scientists. In the process, it was discovered that there exists many commonalities between the natural and social sciences (Blakely & Walkley, 2010). In reality, the lines separating these fields are arbitrary with overlap existing between all academic disciplines. No field is able to claim a monopoly on information or how it may be used to improve the human condition. The great physicist Albert Einstein spent a large portion of his life attempting to explain both the atomic and celestial realms. He insisted that natural events are the direct and predictable result of universal laws (Robinson, 2010; Schweber, 2008; Regis, 1987). This belief led the author to wonder if natural laws could be applied to the social sciences, thereby increasing the understanding of human and institutional behavior. Since Einstein was a physicist and since physics is the most fundamental of all sciences, this paper discusses the concept further.

Critical to the approach used herein is the position exemplified by *The Vienna Circle* – an early twentieth century group of scholars. Its members advocated a unification of all scientific fields (Schweber, 2008; Howard, 2006; Holt, 2005). Einstein himself helped found a similar group called the *Olympia Academy*, which sought knowledge from a variety of social, philosophical and scientific sources (Robinson, 2010; Bernstein, 2006; Kaku &

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Trainer, 1987). The activities of these groups foreshadow recent attempts to eliminate the barriers that separate the sciences.

Physicists have long insisted that a connection exists between all fields. Lee Smolin (2005), Hans Bethe (1999), Freeman Dyson (1988), and Jerome Rothstein (1952), each an acclaimed physicist, have asserted that all serious efforts to advance knowledge must be rooted in an interdisciplinary approach. In fact, physicists are increasingly using their unique insights to explain human behavior (Curry, 2010). Through this exploration of physics, the author discovered that the connections between physics and penology are numerous and might easily serve as the basis for many papers.

This paper has several purposes the first of which is to promote creative and innovative thinking in order to improve the current state of "corrections". Secondly, to show that commonalities exist between seemingly divergent fields and finally, to encourage interdisciplinary-cooperation among students and scholars, alike. Similarly, it is important to explain the meaning of a few terms appearing within this paper in order to avoid confusion.

- "Penology" as it is used herein simply refers to the study of the prison, the inmates, and how each affects the other.
- The word "socio-physics" is used to suggest that an interdisciplinary approach that blends the social and physical sciences provides needed insight into criminality.
- The term "socio-physicists" is used to refer to those scientists that see a value in applying physics to the study of the prison.
- Lastly, the term "particle" refers to both protons and electrons while the term "atom" refers to these particles as well as the nuclei around which they accrue.

### **In the Realm of the Atom**

For those readers not familiar with physics, it may appear a bit peculiar to compare particles to prisoners. Yet both physicists and penologists engage in similar activities. For example, scientists in both fields practice environmental manipulation. While manipulation in physics tends to occur within the laboratory, manipulation within the prison is also common. In fact, everything from institutional paint schemes to the presence of security personnel is intended to affect inmate behavior. While physicists study everything from particles to the vast expanse of the cosmos, for the socio-physicist, inmates are akin to particles while the prison is comparable to the universe.

An interdisciplinary approach to the study of incarceration promises to increase our understanding of its effects on the inmate population. This understanding is necessary since the inmate population has grown by nearly five hundred percent over the past thirty years (Mears, 2008; Vieraitis, Kovandzic & Marvell, 2007; King, Mauer & Young, 2005; Stephan & Karberg, 2003). This unprecedented growth has made the United States the world's leading user of the prison (Spelman, 2009; Crary, 2008; Corbett, 2008; Rosenfeld, 2008). Nearly 600,000 inmates are released from US prisons each year, amounting to about 1,600 each day (Petersilia, 2009). Due to the expense associated with supporting America's 2.3 million inmates and 750,000 correctional staff (Fehr, 2009; Gibbons & Katzenbach, 2006), officials have reduced or eliminated most non-essential services. These services include various treatment and rehabilitative programs (Blakely & Walkley, 2010; Gibbons & Katzenbach, 2006). Reductions of this kind, while considered necessary from a budgetary perspective, prove unpopular. Nearly 90% of Americans support rehabilitative

programs for prisoners (Cullen, 2007; Gibbons & Katzenbach, 2006). Nonetheless, jurisdictions find it increasingly difficult to fund these programs. For example, Connecticut is facing a correctional budget deficit of \$8.5 billion, followed by Washington State with a correctional budget deficit of \$3.6 billion, and Michigan with a correctional budget deficit of \$2.4 billion (Engel, Larivee & Luedeman, 2009). The cost of operating America's correctional system has grown to about \$60 billion a year (Gibbons & Katzenbach, 2006). With costs on the increase, a great deal of interest exists in locating new approaches to enhance the effectiveness of correctional intervention.

Pertinent to socio-physics is the work of Werner Heisenberg (1901-1976). Heisenberg, a German theoretical physicist made substantial contributions to the field of quantum mechanics (Boslough, 1985). Quantum mechanics is a specialized branch of physics that studies the relationship between energy and matter at the atomic level (Cyr, 2009). Heisenberg advanced what is popularly known as the *Heisenberg Uncertainty Principle*. For our purpose, this principle consists of two parts:

- The first deals with a physicist's inability to know both the location and momentum of a particle. It stipulates that an observer can never know both properties simultaneously. In normal situations, a physicist can determine a particle's location or its momentum, but never both. It also concedes that if physicists were able to ascertain both properties simultaneously, more would be known about particle behavior.
- The second portion of this principle suggests that observation changes the behavior of atomic particles (Overbye, 2006). This portion of the Heisenberg Principle (referred to as the Heisenberg Effect) is illustrated in the question, "if a tree falls in a forest and no one is around to hear it, does it make a sound?" While the object in this example is a tree and not a particle, it serves the same purpose. Many physicists argue that without an observer the tree may have acted differently, perhaps failing to produce the telltale sounds associated with a falling object.

Philosopher George Berkeley in *A Treatise Concerning the Principles of Human Knowledge* is the first scholar known to have raised a question about how objects behave when observed (1734). Other versions of the hypothetical-tree question have appeared in popular texts including Mann and Twiss' *Physics* (2010) and Kaku and Trainer's *Beyond Einstein* (1987). Heisenberg's work is especially relevant to the penal setting since it would also prove beneficial for penologists to ascertain an offender's *location* (which is comparable to level of experience) and *momentum* (which relates to the speed at which experience is obtained). Furthermore, if observation can affect particle behavior, then it is reasonable to assume that it can also affect human behavior and can, therefore, be manipulated to produce positive results.

Physicists have also observed that strong relationships tend to develop among particles within an atomic system. Referred to as *quantum entanglement* (a term coined by physicist Erwin Schrodinger), the relationship between these particles becomes so strong that it is impossible to describe one of these "linked" particles without describing the others (Robinson, 2010). These particles become so similar in behavior that for all intents and purposes their actions are in perfect synchrony and they become one object even though they remain separate (Cyr, 2009). The destinies of these particles stay inextricably and instantaneously connected defying both distance and even the speed of light (Robinson, 2010; Cyr, 2009; Highfield, 2008; Regis, 1987). In fact, Einstein (speaking in German)

called this *spukhafte fernwirkung*, which means "spooky action at a distance" (Robinson, 2010; Cyr, 2009; Highfield, 2008; Overbye, 2006). While the causes of entanglement remain unknown, it nonetheless reveals the powerful effects that relationships have on behavior. It is conceivable that a similar dynamic occurs among prisoners, affecting post-release activity.

### **Socio-physics: The Blending of Two Sciences**

While the *Heisenberg Effect* pertains specifically to physics, a similar effect also exists within the social sciences. Perhaps the most famous sociological study ever conducted in the United States highlighting this effect was undertaken (1924-1932) at the Hawthorne Works Factory located near Chicago, Illinois. Since the completion of this study, the name "Hawthorne" has become synonymous with behavioral changes resulting from observation and environmental manipulation (Adair, 1984; Bramel & Friend, 1981). While the findings of this study are voluminous, it is sufficient to say that the owners of Hawthorne wanted to improve productivity. Changes in lighting, the implementation of employee breaks, and gratis meals were adopted (Adair, 1984; Bramel & Friend, 1981). Researchers noticed that virtually every change they implemented led to increased productivity, even when these changes were counterintuitive to employee comfort (Adair, 1984). While reactions to these changes were largely positive in nature, some employees resented and openly opposed them (Adair, 1984; Bramel & Friend, 1981). Talking, horseplay, insubordination, hostility, and poor productivity became the hallmark characteristics of this group. These employees created their own "code of conduct" with anecdotal evidence suggesting their desire to have it adopted by the remaining workforce. This code effectively created an oppositional front to the efforts of administrators and researchers, alike. Thus, two employee-groups emerged, those that were cooperative and amenable toward change and those that were resistant and sought to disrupt operations (Bramel & Friend, 1981). Hence, the significance of this study is twofold. First, positive change was brought about by observation and environmental manipulation and secondly, two groups emerged - those that were change-oriented and those that were change-resistant.

While it remains impossible for physicists to know both the *location* and *momentum* of an individual particle, the importance of this information is not lost on socio-phycists. In fact, socio-phycists are well aware of this information's value and can ascertain both an offender's location and momentum in a simultaneous fashion. For example, penologists can acquire information about these characteristics through interviews, observation, and a review of one's criminal record. While this information is readily available, it is not widely used by correctional specialists to determine offender amenability toward treatment. Without this determination, the effectiveness of treatment may be hindered. In spite of this acquiescence, for the socio-phycist, *location* is identical to criminal experience. An assessment of one's level of experience provides an opportunity to determine the extent to which one has matured within the criminal lifestyle. Similarly, an assessment of one's attitude about continued criminality and correctional intervention can help determine the *momentum* at which criminal experience is being sought or gained. Since each of these factors is closely associated with attitude, they can be described as being positively or negatively oriented. An assessment of one's location and momentum indicates the probable effectiveness of therapeutic intervention. A positive-orientation reflects an attitude favorable toward treatment whereas a negative-orientation signifies an oppositional

demeanor. If an offender has a great deal of criminal experience and is negatively-oriented, it may be difficult or even impossible to slow or halt criminality through treatment, but if it is determined that an offender is in the early stages of his/her career and is positively-oriented, then intensive treatment delivered in a supportive and nurturing environment could end an otherwise extensive career. The similarities that exist between the atomic and penal realms and subsequently between the particle and prisoner are as follows:

- An observer-effect is present in both realms. In the atomic realm, it is often referred to as the *Heisenberg Effect* whereas in the social realm it is often referred to as the *Hawthorne Effect*.
- Various behaviors within the atomic realm can be attributed to particle-entanglement whereas in a penal setting various behaviors can be attributed to peer-entanglement (more on this in the next section).
- Attitudes, behaviors and influence can be described as being positively or negatively oriented.
- In addition, when opposite charges or orientations are present within a system (be it in the atomic or penal realm), energy tends to flow in one direction - from the negative toward the positive state (see below).

For the purpose of this paper, the prison is compared to the nucleus of an atom since it serves as the unifying force that makes congregation and interaction among inmates (our particles) possible. The proton, since it is positively oriented, is comparable to those inmates that have not fully committed themselves to a criminal lifestyle and are amenable toward treatment. Since the electron is negatively oriented, it is compared to those inmates that embrace criminality and disavow treatment. The flow of energy among particles is always from a negative toward a positive state. If energy and peer-influence are comparable, and if particles and prisoners are similar, then it is the negatively oriented inmate that influences those of a positive-orientation. To break the flow of negative energy an insulator is typically used in physics – effectively keeping the negative and positively charged particles from mingling. An insulator of this kind might also prove useful within the penal realm. At present, imprisonment (because it allows mingling to occur between inmates with positive and negative-orientations) tends to be corruptive in nature, thereby increasing the criminal momentum of many offenders (Miller, 1989; Vieraitis, Kovandzic & Marvell, 2007; Adams, Flanagan & Marquart, 1998; Johnson, 1996).

### **Peer-entanglement: Prisoners Behaving Like Particles?**

Researchers have long observed that prior to imprisonment, offenders and non-offenders possess similar values, with offenders engaging in conventional behaviors a majority of the time (Copes & Topalli, 2010; Zara & Farrington, 2009; Lilly, Cullen & Ball, 2006). Pro-social values are evident in the guilt that often follows the commission of a crime (Copes & Topalli, 2010; Lanier & Henry, 1998). Yet pro-social values can be weakened through exposure to a negatively oriented environment (Glaze & Bonczar, 2007; Vieraitis, Kovandzic & Marvell, 2007; Johnson, 1996; Wellford, 1967; Buchanan, 1921). If pro-social values can be weakened by exposure to a negative environment, then it makes sense that they can also be strengthened when exposed to a positive environment.

It has been noted that experienced and violent inmates have created a prison-culture that rejects all authority that is not inmate-based (Blakely & Walkley, 2010; Faulkner &

Faulkner, 2006; Jiang & Fischer-Giorlando, 2006; Wellford, 1967). In addition to opposing correctional efforts, this culture requires less-experienced inmates to submit themselves to the wills of those that are more criminally accomplished (Carceral, 2004; Friedman, 1993; Kauffman, 1988; Jarvis, 1978; Welford, 1967). While many offenders possess pro-social values, once incarcerated they may have little choice but to adopt the negative attitudes of those inmates that are more criminally and violently inclined (Vieraitis, Kovandzic & Marvell, 2007; Miller, Schreck & Tewksbury, 2006). Within the penal environment, the term "peer" assumes a broad meaning. One's institutional-peers are not limited to those with whom one directly associates, but by default includes all those of a similar status. This shared status creates a close-knit community, making it especially difficult for positively oriented inmates to withstand the effects of negative peer-pressure.

It has also been observed that actions are influenced by the dominant values, norms, and beliefs present within one's environment (Wooldredge, 2006). Research reveals that peers have an influence on the development of behavioral-patterns (Zara & Farrington, 2009; Lee & Smith-Adcock, 2005). If one's environment includes positive and nurturing peers that ascribe to socially productive values, one's behavior is likely to be positive and nurturing, but if one's environment is negative, then one's behavior may also become negatively oriented (Zara & Farrington, 2009; Berk, 1972; Buchanan, 1921). This dynamic may prove to be especially problematic for the young and inexperienced inmate (Lee & Smith-Adcock, 2005; Wellford, 1967). Forcing offenders with a pro-social orientation to conform to a negatively oriented culture may be a socially destructive practice. The consequences of this practice may extend beyond the prison's walls, forever forging a "negative link" between the ex-inmate and his/her institutional peers. Similar to particle entanglement, this link may withstand the effects of both time and distance, influencing actions well into the future.

### **The Solution**

For most of United States history, offender reform was a recognized correctional objective (Blakely, 2008). Groups that included the Philadelphia Society for Alleviating the Miseries of Public Prisons (1790) sought to humanize the prison and reform amenable inmates by separating them from those inmates that were hardened and violent. Officials of the Walnut Street Jail (Philadelphia, PA), America's first prison, pioneered the separation of young, inexperienced and less assertive inmates from those that were more predatory in nature (Johnson, 1996; Buchanan, 1921). Similarly, officials at the Elmira Reformatory (Elmira, NY), another early American prison (1876), aggressively pursued offender reform. Anecdotal evidence suggests that its officials believed that greater success would have been achieved had they separated amenable inmates from those that opposed treatment (Stone, 2005; Buchanan, 1921). A separation of inmates according to amenability might have eliminated opportunities for those that were negatively oriented to coerce, intimidate, corrupt, or otherwise victimize those that were malleable (Johnson, 1996). This proposed separation is based upon the belief that negatively oriented inmates corrupt and victimize others (Wolff et al., 2007; Johnson, 1996; Kauffman, 1988; Buchanan, 1921). In fact, it has been observed that negatively oriented inmates influence those that are less criminally experienced (Vieraitis, Kovandzic, & Marvell, 2007). An incentive exists for positively oriented inmates to assume a negative-orientation in an attempt to blend into a culture that demands conformity. The allure of assimilation is

strong since it results in acceptance and access to goods and services that mitigate the “pains of imprisonment” (Faulkner & Faulkner, 2006; Schmid & Jones, 2006; Kauffman, 1988; Wellford, 1967). Assimilation into this culture requires opposition to treatment and reform initiatives (Hemmens & Marquart, 2006; Kauffman, 1988; Johnson, 1996; Wellford, 1967). Perhaps the most ardent supporter of inmate-separation based on amenability was Howard Gill. Gill asserted that while some inmates desire treatment others do not. Accordingly, officials should determine into which of these two groups each inmate belongs. Based on this determination, each group would be housed separately, just as adult and juvenile offenders and male and female offenders are kept separate (Blakely, 2008; Gill, 1962).

Upon recognizing that there are positively and negatively oriented inmates, it then becomes possible to create new prisons to meet the unique needs of each group. For positively oriented inmates these prisons would be characterized by many opportunities for treatment, therapy, and education. These prisons would promote a positively charged peer culture where inmates would observe, encourage and support one another in their pursuit for personal reform. For negatively oriented inmates, prison would be a safe and secure environment where needs could be met in an efficient manner. The separation of these two groups would effectively serve to insulate positively oriented inmates from negative influences.

## Conclusion

Numerous perspectives in both the physical and social sciences attest to the effects of environment and peer-influence as well as the destructive power of negativity. Currently, 95% of all inmates return to the society with approximately 60% of them being re-arrested shortly after release (Fehr, 2009; Petersilia, 2009; Gibbons & Katzenbach, 2006; Hughes & Wilson, 2002). Citizens would undoubtedly agree that such a high recidivism rate is unacceptable. Perhaps recidivism rates would decrease if officials were to create prisons where a positive and supportive culture was used to promote and reinforce therapeutic efforts. Such an approach is consistent with society's desire to provide treatment as a means to reduce crime.

Socio-physics, to the extent to which it is developed herein, suggests that imprisonment will continue to be ineffective at breaking the criminogenic cycle until the indiscriminate mixing of inmates ceases. Perhaps this cycle can be broken if treatment is provided to positively oriented inmates in a friendly, supportive, and nurturing environment. A determination must also be made about each offender's *location* and *momentum*. When this information is evaluated, a greater understanding of each offender's needs and risks can be ascertained making it possible to more accurately target problematic behaviors and thought-processes. While a majority of Americans support treatment for prisoners (Cullen, 2007) we must acknowledge the existence of negatively oriented inmates that actively seek to corrupt the rehabilitative process. For them, simple-confinement appears to be the most appropriate form of correctional intervention.

For centuries, physicists have sought to advance our understanding of the natural world. This pursuit has taken a great deal of effort, innovation, creativity, and interdisciplinary-insight before success was achieved. The task of creating an effective prison system is no less daunting. Perhaps the atom and the prison are similar - after all, both involve positively and negatively oriented elements whose proper management serves the greater social-good. While the task is formidable, the first step in breaking the

criminogenic cycle appears quite simple – insulate those inmates that are positively oriented from those that are negatively oriented.

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